

INSTRUMENTATION DEVELOPMENT (MID)

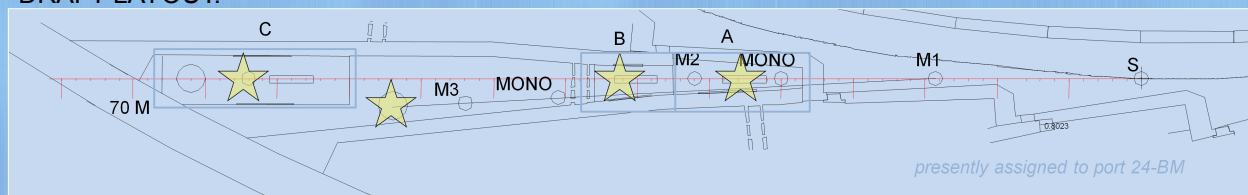
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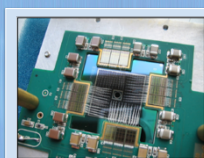
TECHNIQUES AND CAPABILITIES

- 50 eV – 50 keV available from NSLS-II BM port
- Four highly configurable experimental stations to handle different energies and geometries:
 1. Optics table in hutch A (first optics enclosure)
 2. Optical table and chamber in hutch B
 3. Optical table & diffractometer in hutch C
 4. Vacuum reflectometer on soft branch
- Highly flexible beamline layout to allow white, pink and monochromatic beams:
 1. Main branch:
 - a) DCM/DMM Monochromator
 - b) Focusing mirror
 2. Soft x-ray side branch:
 - a) Horizontal collection mirror
 - b) Grating mono
 - c) Refocusing mirror

DRAFT LAYOUT:



APPLICATIONS



Maia detector developed at BNL for microbeam x-ray spectroscopic imaging



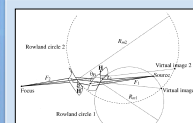
640-channel strip detector; development of germanium sensors for high energy applications in progress



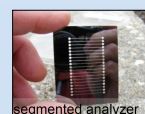
A bi-prism interferometer used in for coherence metrology of synchrotron beams



Hartmann Wavefront sensor developed at SOLEIL for wavefront metrology of adaptive optics



A fixed-exit monochromator using two sagittally bent Laue crystals developed at BNL for high energy experiments



A prototype monolithic analyzer crystal for multi-element powder diffraction in development at BNL

Detector systems

Characterization and calibration of arrayed spectroscopic detectors for high-throughput diffraction, spectroscopy and imaging

Optics

- X-ray profilometry and reflectometry of mirrors and gratings
- Wavefront analysis
- Diffractometry
- Topography (main branch)

Integrated systems

- Monochromators, spectrometers and polarimeters
- Environments
- Precision positioning and temperature control
- Automation

OUTLINE OF PROJECTED ACTIVITIES

Program Priorities

Development of new beamline devices and methods

- In-house detector and spectrometer development, high-performance crystal optics, positioning and temperature control, coherence and brightness-preserving reflective, refractive, and diffractive optics, integrated sample / optics / collection environments, polarimeters etc.
- Additional needs expected to arise but which cannot fully be projected

Characterization of beamline optical components and detectors

- New commercial devices to be installed on other beamlines, including mirrors, monochromators (including both crystals and gratings), detectors, phase plates, zone plates, etc.
- Other "standard" devices designed and built in-house

Collaboration with and support of users with similar development needs

- MID will support facility instrumentation needs, to keep science at NSLS-II on the cutting edge
- Beamline operation to commence as early as possible in the life of NSLS-II
- Internal development and commissioning needs presently being collected